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RATCHET DRIVER

Background

The present invention relates to a hand tool and more particularly to an improved ratchet driver hand tool, such as a screwdriver, which permits the driver to turn in one direction only, in the opposite direction only or both directions. Present ratcheting mechanisms are complicated to use and are expensive to manufacture and assemble.

Objects

The present invention avoids these drawbacks and has for one of its objects the provision of an improved ratcheting mechanism which is simple to use.

Another object of the present invention is the provision of an improved ratcheting mechanism which is simple and inexpensive to assemble and manufacture.

Other and further objects of the invention will be obvious upon an understanding of the illustrative embodiment about to be described, or will be indicated in the appended claims and various advantages not referred to herein will occur to one skilled in the art upon employment of the invention in practice.

Drawings

A preferred embodiment of the invention has been chosen for purposes of illustration and description and is shown in the accompanying drawings forming a part of the specification wherein:

Fig. 1 is a plan view of a ratchet driver hand tool made in accordance with the present invention.

Fig. 2 is a top view thereof.

Fig. 3 is a sectional view taken along the lines 3-3 of Fig. 1 showing the position of the parts when the driver is to rotate in both directions.

Fig. 4 is a similar sectional view showing the position of the parts when the driver is to rotate in one direction only.

Fig. 5 is a similar sectional view showing the position of the parts when the driver is to rotate in the opposite direction only.

Fig. 6 is a partial and fragmentary sectional view taken along line 6-6 of Fig. 1.

Fig. 7 is a simplified schematic perspective view of the ratchet mechanism of the present invention.

Fig. 8 is another simplified schematic plan view of the ratchet mechanism of the present invention.

Description

Referring to the drawings, the driver 1 of the present invention, which may be a screwdriver, comprises a handle 1 and a ratchet control assembly 3 operatively associated with the handle 2 and rotatable relative thereto. The ratchet control assembly 3 comprises a plug 4, mounted in the handle 2 by its foot 5, and an integral head 6 extending above the handle 2. The head 6 has an integral upwardly extending neck 7 which has an annular groove 16 therein. An integral ledge 17 connects the foot 5 to the head 6. A driver assembly 10 is rotatably mounted on the head 6 of the ratchet control assembly 3 and comprises shank 8 and an upstanding stem 9. The stem 9 has an adaptor 13 mounted thereon into which various types of drive bits may be mounted. A ratchet sleeve 15 surrounds the head 6 of the ratchet control assembly 3 and shank 8 of the driver assembly 10 and rests on the ledge 17 of the ratchet control assembly. The shank 8 and the ratchet sleeve 15 are connected together by pin 11 so as they can rotate together. The pin 11 extends in the groove 16 to maintain the axial relationship of the ratchet sleeve 15 and the shank 8 and to permit the driver

assembly 10 (shank 8 and stem 9) and the ratchet sleeve 15 to rotate together relative to the ratchet control assembly 3 (head 6, neck 7 and ledge 17). An outer cover 12 overlies and is rotatable relative to the ratchet sleeve 15, the shank 8 and the head 6.

The ratchet sleeve 11 has a plurality of control grooves 20 therein opening inwardly along its inner surface. The head 6 has a pair of inwardly extending slots 21 and 22 therein which are preferably parallel to each other. Within each slot 21-22 is mounted a stop slide 23-24, respectively, each of which is spring biased outwardly toward control grooves 20 in the ratchet sleeve 11 by a spring 25 so that their outer edges 23 A - 24 A, respectively, enter into two of the grooves 20 (e.g. grooves 20A and 20B) of the ratchet sleeve 15.

A control cam 30 is mounted in an outer groove 31 formed in the ratchet sleeve 15 so that it lies between the outer cover 12 and the ratchet sleeve 15 and is movable back and forth within the outer groove 31 along the same plane or path. The control cam 30 is narrow, elongated and curved with tapered outer edges 31 and 32 (Fig. 8). The control cam 30 has a pin 33 which extends outwardly from its lower end and which extends through the outer cover 12. In order to move the control cam 30 in one direction or the other, the outer cover 12 is rotated in one direction or the

other so as to move the control cam 30 in either direction through the intermediation of the pin 33.

The ends 31-32 of the control cam 30 are in front of the outer edges 23A -24A of the stop slides 23-24. The outer edges 23A-24A of the lock slides 23-24 are normally in control grooves 20A and 20B, respectively. When the control cam 30 is moved to one side , its end 31 will press stop slide 23 inwardly into its slot 21 against the pressure of spring 25 so that its front edge 23A is moved out of its control groove 20A. This allows the ratchet sleeve 15, shank 8 and stem 9 to turn in one direction only since the outer edge 24A of the other stop slide 24 is still in the control groove 20B and will permit rotation in that direction only. If the shank 8 and stem 9 is rotated in the opposite direction, it will slide past the control grooves 20 without moving the ratchet sleeve 15. When the control cam 30 is moved to the center, the end 31 is moved away from the outer edge 23A of the stop slide 22 and the spring 25 in slot 21 moves the stop slide 22 outwardly to cause the outer edge 23A to move into control groove 20A. The other stop slide 22 is not affected so that, the outer edge 23A-24A of both stop slides 23-24 are in the control grooves 20A and 20B thereby permitting the shank 8 and stem 9 to move in both directions. When the control cam 30 is moved to the other side,

the other stop slide 24 is moved inwardly in slot 22 against the spring 25 by the end 32 of control cam 30 and its front end 24A is moved out of the control groove 20 B. Hence, the shank 8 and stem 9 can now rotate in the opposite direction only since the front end 23 A of the other stop slide 23 is still in its control groove 20A. The control cam 30 is moved back and forth by rotating the cover 12 back and forth so as to move pin 33 back and forth which carries with it the control cam 30.

It will thus been seen that the present invention provided an improved ratcheting mechanism which is simple to use and which is simple and inexpensive to assemble and manufacture.

As many and varied modifications of the subject matter of this invention will become apparent to those skilled in the art from the detailed description given hereinabove, it will be understood that the present invention is limited only as provided in the claims appended hereto.